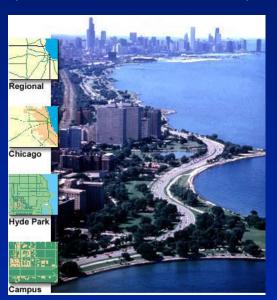
Project Title: Optimizing Heart and Brain Cooling During Cardiac Arrest

Sponsor: National Heart, Lung and Blood Institute/ BRP

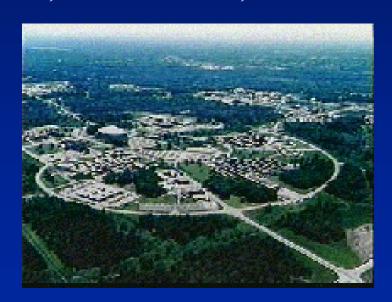
Emergency Resuscitation Center

A Bioengineering & Medical Research Partnership

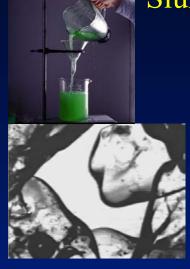
University of Chicago PI; Lance B. Becker, MD



Argonne National Laboratory, IL Lead; Ken E. Kasza, PhD



Development of Ice Slurry Human Coolants and Medical Protocols For Rapid Induction of Brain/Heart/Organ Cell Protective Hypothermia



Slurry Characteristics

--Water phase (% wt)50-75%

--Ice phase (% wt) 25-50%

--NaCl (% wt) 0.9%

--Particle size 0.1 mm

--Particle shape globular

--Surface smooth

-0.3-(-1.2) ° C

--Flowability good

water $\Delta 1^{\circ}$ C = 1 cal/g melt ice = 80 cal/g

Status Year 2

- •Developed calorimetry to measure slurry ice content
- •Established use of fluorescent micro-spheres to measure regional blood flow partition
- •Developed ability to make slurry onsite/on-demand of 42% ice
- •Experiments with IV cooling (50 ml/kg) showed slurry (20% ice) cools brain more rapidly/deeper than cold saline and decreases bolus volume necessary to achieve hypothermia (brain delta 4 C)
- •Experiments confirmed GI slurry (40% ice) cooling effectiveness using modified gastric tube at 30ml/kg bolus
- •Performed confirmatory pilot exp. using intraperitoneal ice slurry cooling

Possible Administration

IV
Naso-gastric tube
Intra-peritoneal
Intra-pulmonary (PFC)

Swine Model

Instrumented
Temp probes
CA or NL circulation

